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Milk Production and Survival of Spring-calving Carryover Cows in New Zealand Dairy Herds

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Abstract

Non-pregnant cows are generally culled from dairy herds and replaced with two-year-old heifers. Alternatively, non-pregnant cows can be dried-off at the end of lactation, retained for one year (carried over), before being mated and returned to a milking herd in the following year. In this study, calving interval was used as a tool to identify and define the carryover cow population in spring-calving dairy herds. Linear modelling methods were used to compare carryover cow milk production with that of heifers, lactation-matched and age-matched non-carryover cows. Lastly, the survival for second-lactation carryover cows was compared with that of two-year-old heifers and lactation-matched non-carryover cows. Results showed that annually, 2.5% of spring-calving cows had returned to a milking herd after a carryover period in the previous year. Of those carryover cows, 43% returned to a milking herd at four years old, after failing to conceive in their first lactation. Most (69%) dairy herds contained less than 5% carryover cows and 17% of dairy herds comprised of zero carryover cows. The difference between the proportion of Holstein-Friesian in the carryover cow and non-carryover cow group was minimal (2%) but statistically greater ($P<0.01$) for the carryover cow group. Estimated breeding values (EBVs) for milk traits (milk yield, fat yield, protein yield and somatic cell count) were greater ($P<0.01$), but fertility EBVs were lower ($P<0.01$) for the carryover cow group in the year when they failed to conceive, compared to those for the non-carryover cow group. These were reflected in greater ($P<0.01$) selection indices (Breeding Worth and Production Worth) for carryover cows. After the carryover period, EBVs for milk traits and fertility decreased, and Breeding Worth was lower ($P<0.01$) for the carryover cow group, compared to the non-carryover cow group. Carryover cow milk yield, fat yield, protein yield and somatic cell score was greater ($P<0.01$) than those for heifers, lactation-matched and age-matched non-carryover cows in their first carryover year. This milk production advantage was maintained for up to three carryover years, if the carryover cow maintained an annual calving pattern, but at a decreasing rate. The probability of survival (days) was lower ($P<0.01$) for second-lactation carryover cows when compared to heifers and lactation-matched non-carryover cows. These findings are important for

the New Zealand dairy industry as they can aid on-farm culling (removal from the herd) decisions.

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List of Abbreviations

BCS = Body condition score

BW = Breeding Worth

CIDR = Controlled internal drug release

CO = Carryover

EBV = Estimated Breeding Value

FY = Fat yield

LIC = Livestock Improvement Corporation

LW = Lactation Worth

MY = Milk yield

NCO = Non-carryover

NZAEL = New Zealand Animal Evaluation Limited

PW = Production Worth

PY = Protein yield

SAS = Statistical Analysis System

SCC = Somatic cell count

SCS = Somatic cell score
